

Up-to-date information for the health care professional

DENTAL HEALTH FACT SHEET

FLUORIDE SUPPLEMENTATION

INTRODUCTION

Community water fluoridation has long been recognized as the most efficient and cost-effective method of providing recommended levels of systemic fluoride for the prevention of dental caries. Fluoride supplements have been proven to cause significant caries reductions in children living in suboptimally fluoridated areas.

It Is Essential That The Fluoride Content Of The Patient's Drinking Water Be Determined Prior To Prescribing Fluoride Supplements.

PRIMARY SOURCES OF FLUORIDE CONSUMPTION

- ◆ **Residence Water:** If patient is drinking community water, the fluoridation status should be known. Is the community water fluoridated to optimal levels (1.1 parts per million for Wisconsin)? Is the community water naturally fluoridated above 0.6 parts per million? If the community water is deficient in fluoride, what is the natural level? If patient is drinking independent private well water, the water should be tested for natural fluoride content.
- ◆ **School and Day Care Water:** Determine if child's primary source of water is at school or day care.
- ◆ **Bottled Water:** Most delivered domestic water and water obtained from stores contain insignificant amounts of fluoride. However, some brands do contain levels of fluoride that would affect the supplement dosage schedule.
- ◆ **Dietary - Breast Milk or Cow's Milk:** The manufacturers of infant formula now make their products with defluoridated water, so the fluoride content is less than 0.3 ppm. An infant on milk-based formula now receives fluoride almost exclusively from the water, which is mixed with the formula. The practitioner must determine the proportion of bottle-feeding and reduce or eliminate the supplement accordingly. Soy-based formulas contain higher levels of fluoride, and systemic fluoride supplementation may not be indicated when "ready-to-feed" soy-based formula is used exclusively. Significant changes in feeding patterns, such as breast-feeding to bottle-feeding or solid foods may need supplement adjustment.
- ◆ **Dietary - Solid Foods:** Most infant foods contain low levels of fluoride, although some contain appreciable amounts. However, the intake of solid foods reduces fluoride absorption to about 60% of intake.

QUESTIONS AND ANSWERS

When are Dietary Fluoride Supplements Needed?

Dietary fluoride supplements are needed when drinking water supplies have inadequate amounts of fluoride. Children who live in areas without adequate natural fluoride in public water supplies or individual home water supplies, or in communities that have not yet adopted water fluoridation, need a dietary fluoride supplement.

How do Dietary Fluoride Supplements Benefit Children's Teeth?

Dietary fluoride supplements provide a systemic source of fluoride that is incorporated into the developing teeth. In addition, dietary fluoride tablets provide a topical effect to erupted teeth when the tablet is dissolved and swished before swallowing. Both the systemic and topical effects lead to a decrease in the incidence of dental caries (tooth decay) in both primary (baby) and permanent teeth. Therefore, the benefits of dietary fluoride supplements can last a lifetime.

How Effective are Dietary Fluoride Supplements?

Dietary fluoride supplements have proven to be effective in reducing the incidence of dental caries by up to 50% in primary teeth. Dental caries are reduced by as much as 30% in permanent teeth when fluoride supplements are taken as directed.

What Forms of Dietary Fluoride Supplements are Available?

Dietary fluoride supplements are provided by prescription in liquid or tablet forms as fluoride drops, fluoride tablets or lozenges, fluoride-vitamin drops, fluoride-vitamin tablets, and oral rinse supplements. Most fluoride supplements available in the U.S. contain sodium fluoride.

When Should Dietary Fluoride Supplements be Started?

The greatest benefits occur if dietary fluoride supplements are taken each day throughout childhood, starting at 6 months of age.

When Should Dietary Fluoride Supplements NOT be Used?

Dietary fluoride supplements should not be used in areas where there are adequate levels of fluoride in the drinking water. Prior to prescribing fluoride supplements, the fluoride content of the water consumed by the child needs to be evaluated. The current dosage schedule recommended by the American Dental Association and American Academy of Pediatrics should then be used to determine the correct dosage for each fluoride supplement prescription.

Should Infants Who are Breast-fed AND Live in a Fluoridated Area Receive Fluoride Supplements?

Practitioners may wish to consider supplements for infants who are breast-fed and live in a fluoridated area. Caution should be applied, however, in prescribing supplements to these children. Introduction of additional baby foods at early ages is well documented with as few as 10% of infants breast-fed exclusively for as long as 4 months. Frequent contact with the mother is required to ascertain changes in feeding habits and strict instructions concerning discontinuation of supplements if additional foods or fluoridated water are added to the diet. Studies of the efficacy of fluoride supplements given for short periods to breast-fed children living in fluoridated areas suggest limited caries reductions. Therefore, many dental public health professionals do not believe fluoride supplements are necessary for infants who are breast-fed and live in a fluoridated area.

How do you Determine the Appropriate Supplement Dosage for a Child Who Consumes Significant Amounts of Water From Sources That Differ in Their Fluoride Concentration?

For children who consume water from sources that differ in their fluoride concentrations, a determination of the "effective" concentration should be made whenever possible. The "effective" concentration is the weighted average of the water concentrations. It is calculated by multiplying the fraction of the average total daily water intake from each source by the fluoride concentration at that source and adding the results. For example, assume that the fluoride concentration of the home water supply is 0.1 ppm and that water accounts for 50% of the average total daily water intake ($0.1 \text{ ppm} \times 0.50 = 0.05 \text{ ppm}$) and that the school or child-care facility water supply has 1.0 ppm fluoride and 50% of the water intake is from that source ($1.0 \text{ ppm} \times 0.50 = 0.50 \text{ ppm}$). In this case, the "effective" water fluoride concentration would be: $0.05 + 0.50 = 0.55 \text{ ppm}$. The prescription for dietary fluoride supplementation should be based on the "effective" concentration of 0.55 ppm, not on the 0.1 ppm concentration of the home water supply.

Are There any Advantages or Disadvantages with Prescribing Fluoride-Vitamin Supplements?

Fluoride-vitamin supplements are as effective in preventing dental caries (decay) as fluoride supplements alone. If vitamins are indicated for a child living in an area with a suboptimal concentration of fluoride in the water, the fluoride-vitamin combination can be beneficial for that individual.

However, the fixed formulation of a fluoride-vitamin sometimes makes it difficult to adjust the supplemental fluoride intake for concentrations of fluoride already in the water. Therefore, extra care should be taken when prescribing fluoride-vitamin supplements to ensure the proper level of fluoride is being provided. In addition, care should be taken to continue fluoride supplements after the need for the vitamins are discontinued.

How Should Dietary Fluoride Drops be Given to a Young Child?

Infants and young children should be given dietary fluoride supplements in liquid form, as fluoride drops or fluoride-vitamin drops. The drop(s) may be placed on the tongue and swallowed or added to the child's beverage. If the latter

method is used, the fluoride should be given with water or juice, but not with milk, which tends to bind fluoride ions and slow absorption.

When Should a Young Child Switch From a Drop to a Tablet Form of a Dietary Fluoride Supplement?

The young child should use dietary fluoride drops until he/she can master dissolving and swallowing the tablet. Professionals recommend that drops be continued until age two or possibly age three.

At What Time of Day Should the Dietary Fluoride Supplement be Taken?

It is very important to have the child take the dietary fluoride supplement daily at a convenient time. A routine time, such as bedtime should be chosen and adhered to so that the fluoride supplement is taken each day.

When Should the Dietary Fluoride Supplement Prescription be Changed?

The prescribed dose of the fluoride supplement should be monitored to ensure that the child is receiving adequate amounts of systemic and topical fluoride. The dosage may need to be changed when:

1. An infant in a fluoridated area consumes anything in addition to breast milk;
2. An infant in a fluoridated area consumes anything in addition to "ready-to-feed" formula;
3. A child reaches age three and age six;
4. There is a change in the source of the child's drinking water.

When Should Dietary Fluoride Supplements be Discontinued?

Dietary fluoride supplements provide a systemic source of fluoride to teeth, including second molars, as they develop before eruption. In addition, if dietary fluorides are allowed to dissolve in the mouth before being swallowed, they provide a topical source of fluoride, which benefit the teeth that have already erupted. The American Academy of Pediatrics and the American Dental Association recommend the use of fluoride supplements until age 16, when tooth calcification is complete. Both professional associations concur that the use of fluoride supplements can provide caries protection during the teenage years.

For More Information Contact

Warren R. LeMay, DDS, MPH
Chief Dental Officer
Division of Public Health
1 W. Wilson Street, P.O. Box 2659
Madison, WI 53701-2659 Telephone: (608) 266-5152

References

1. Arizona Department of Health Services. Fluoride Supplementation-for the Life of Your Practice: A Resource Guide.
2. Kula, K. and Wei, S.: Fluoride Supplements and Dietary Sources of Fluoride. In Clinical Uses of Fluorides. Edited by S.H.Y. Wei. Philadelphia, Lea & Febiger, 1985.
3. Cowles, K. Center for Disease Control, Atlanta, GA. Personal Communication.
4. Levy, S. University of Iowa, Iowa City. Personal Communication.
5. Workshop Report. Dietary Fluoride Supplements. J Dental Research 1992; Vol 71 No 5: 1226.